

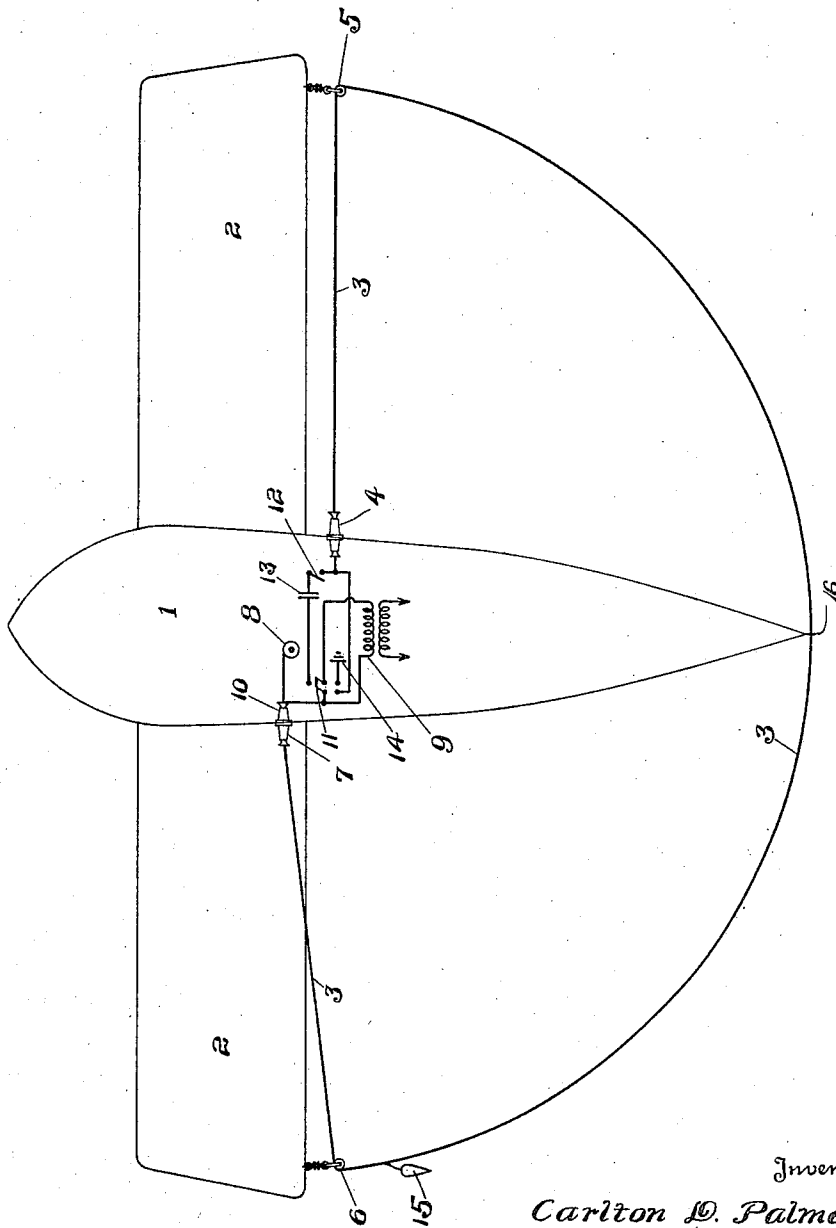
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RADIO ANTENNA FOR AIRCRAFT

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RADIO ANTENNA FOR AIRCRAFT.

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To all whom it may concern:

Be it known that I, CARLTON D. PALMER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Radio Antennæ for Aircraft, of which the following is a specification.

My invention relates to radio antennæ for aircraft and has for an object to provide an antenna that may be instantly changed in effect from a loop antenna to a double trailing wire antenna and vice versa.

Another object of my invention is to obtain greater radiation and greater transmitting wave lengths than is possible in the use of the usual single trailing wire antenna.

A further object is to provide an antenna of this character which will permit aircraft to fly at lower altitudes than when using the single trailing antenna.

Another object of my invention is to provide an antenna of this character which will give very erroneous bearings on radio direction finders at shore stations, thereby concealing the aircraft's true position; and yet, one which may be instantly arranged to operate exactly as a trailing wire antenna whereby it is possible to take bearings from shore stations when desired.

Further objects of my invention are to provide an antenna which may be manipulated with far greater ease than the trailing wire antenna, and one which will function while the aircraft is on water or ground.

I will now proceed to describe my invention in detail, reference being had to the accompanying drawings in which:

The figure is a diagrammatic view of my antenna applied to an aircraft shown in plan view.

Referring to the figure, the fuselage or boat, and wings of any type of aircraft are indicated by numerals 1 and 2, 2, respectively.

An antenna wire 3, passes through an insulator 4 to a point adjacent the extreme end of one of the wings, the right wing as shown in the drawings, where it may be reeved through an insulated pulley 5. From this point 5 the antenna wire leads under the fuselage, or to the rear of the fuselage over a hook 16 to a point adjacent the extremity of the other wing where it passes over an insulated pulley 6, and then on through an insulator 7 to a reel 8 on which the antenna is wound.

A small weight 15 may be attached to the

antenna wire for the purpose of steadying the antenna while in flight, and by being placed approximately in the position shown in the drawing with the antenna reeled in, it will be approximately in the rear of the fuselage when the antenna is reeled out.

As previously stated one of the objects of my invention is to provide means whereby the antenna may be instantly changed in effect from a double trailing wire antenna to the loop antenna and vice versa. It is obvious that various arrangements of switches might be used to accomplish the above purpose and it is therefore to be understood that the structure which I have shown diagrammatically is to be considered merely in an illustrative sense, and that any means for accomplishing the same purpose might be substituted without departing from my invention. A description of the arrangement I have shown follows:

The radio set referred to generally by numeral 9 is connected to a metallic bushing 10 through which the antenna 3 passes, whereby an electrical connection is provided between the radio set and the antenna. Included in the circuit are a double pole double throw switch 11, a single pole single throw switch 12, a condenser 13, which may be variable if desired, and a ground connection 14 usually comprising a connection to the bonded together stay wires and other metal parts of the plane. With switch 11 closed to the left and switch 12 closed, it is apparent that the antenna acts as a loop with condenser in series. By reversing the position of switch 11 and opening switch 12 the condenser 13 is cut out, and the ground cut in with the result that a double trailing wire antenna is provided.

When the antenna is not in use it is wound upon the reel so that it extends in substantially parallel lines between the two extremities of the wings. Then, when in flight, it is desired to use the antenna, the reel is released and the antenna unwound to the extent desired and when so released the air pressure and weight will cause the antenna to run out and stream astern.

Instead of reeling the antenna up under the fuselage when not in use, a hook 16 or equivalent means may be provided in the tail of the fuselage so that in reeling in the antenna the wire will be received in the notch and thus when in inoperative position that

part of the antenna, which is not on the reel, will extend in the form of a triangle between the two points of attachment to the wings and the tail of the fuselage. Of course the notch or equivalent means would be arranged in such a position that it would receive the antenna when reeling in during flight.

It is obvious that the electrical resistance in an antenna of this character is less than in the single trailing wire antenna, there being two paths for the current, and further, the capacity is greatly increased, with the result that both the radiation and the transmitting wave lengths are increased.

The weight used is similar to that used with the single trailing wire antenna, but as the head resistance of a loop is much greater than that of a single wire, it is evident that the loop will not stream down as far below the aircraft as in the case of a single trailing wire, thus permitting the use of the radio at much lower altitudes.

It has been found in practice that when using this type of antenna in the form of a loop, bearings taken by radio direction finders at shore or other stations give very inaccurate results, thereby concealing the true position of the aircraft, which is of importance for strategical purposes. As previously stated, however, the loop antenna may

be instantly changed in effect to the trailing wire antenna thereby permitting bearings to be taken if desired.

When on the water or ground a light pole with a hook at its end may be used to lift and hold the wire in an elevated position, and it can be used thus as a loop antenna or elevated antenna. While the efficiency will be decreased materially when so used, the arrangement offers an emergency means for communication.

While my antenna is shown applied to a heavier-than-air machine, it is to be understood that it is equally well adaptable to lighter-than-air machines, and I contemplate such use.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. An antenna for aircraft radio including an antenna wire extending outside the aircraft in the form of a loop from two distant points on an aircraft and means for making said wire effective either as a loop antenna, or as a trailing wire antenna, as desired.

2. An antenna for aircraft radio, including an antenna wire and means for making said wire effective either as a loop antenna or as a trailing wire antenna, as desired.

CARLTON DAVID PALMER.